Plastic Water Line Survey – Industry Contacts

Question 1: Are you aware of any research papers on this subject that would be beneficial to us and readily available? If so, how could we obtain a copy (i.e., internet site, contact information, etc.)?

Organization	Individual Contacted	Response
American Water Works Association (AWWA)	Mr. Jim Wailes, Standards Program Manager	"Attached is an abstract listing from AWWA Waternet. Waternet is a bibliographic database that contains references to all of AWWA's publications dating back to 1971. You can obtain AWWA publications by calling customer service (800-926-7337) or at the AWWA online bookstore at http://www.awwa.org/. Additionally, an interesting white paper on Permeation and Leaching was produced as a derivative of two EPA workshops in 2000 and 2002. See http://www.epa.gove/safewater/tcr/tcr.html#distribution."
National Pipe & Plastics, Inc.	Mr. Eric Paugh, Engineering Manager	Referred us to the Uni-Bell PVC Pipe Association.
Society of Plastics Engineers	Ms. Susan Oderwald, Executive Director	Forwarded our request to the Chair of SPE's Plastics Pipe Division, Mr. Donald E. Duvall. "Obviously, we do not give out technical opinions on behalf of the Society (we would like to, but liability issue preclude us from doing so)."
Engineering Systems, Inc.	Mr. Donald Duvall, Ph.D., P.E.	"I personally have no copies of reports from studies that address this issue. There are two places where you might go for more information. The Plastics Pipe Institute (PPI) in Washington, DC is the leading polyolefin pipe trade organization in North America. The Uni-Bell PVC Pipe Association of Dallas, TX is a similar trade group that represents the interests of the PVC water pipe industry. Two other organizations that might have information on this issue are the American Water Works Association (AWWA) and the National Sanitation Foundation (NSF)."
National Sanitation Foundation (NSF)	Ata Ciechanowski, Manager-Engineering Lab	"…you might want to contact either Unibell (for PVC) or PPI (Plastics Pipe Institute for PE)".
Awwa Research Foundation	Ms. Maureen Hodgins, Project Manager	-Vonk, Permeation of Organic Compounds Through Pipe Materials, Pub. # 85, KIWA, Neuwegein, Netherlands, 1985. (M.W. Vonk of the Netherlands' Waterworks Testing and Research Institute) -Cassaday, Cole, Bishop & Pfau, Evaluation of the Permeation of Organic Solvents Through Gasketed Jointed Unjointed Poly (Vinyl Chloride), Asbestos Cement and Ductile Iron Water Pipes - Phase 1 Report; Battelle Columbus Laboratories, Columbus, OH, for the VInyl Institute, Div. of Soc. of Plastics Indus, Inc. 1983. (MJ Cassaday and JP Pfau of Battelle Laboratories) -Berens, Prediction of Organic Chemical Permeation through PVC Pipe, JAWWA 77 (11), 57-64 (1985). (AR Berens of the BF Goodrich Research and Development Center)
Uni-Bell PVC Pipe Association	Mr. Craig Fisher, P.E., Technical Director & Western Regional Engineer	"Yes. We can mail them to you. We have three or four that we think you will find most useful. Let me know if you would like them mailed to you. These would mostly focus on PVC and on gaskets."

Ductile Iron Pipe Research Association	Mr. Mark Brazlon (sp?)	Referred us to Alan Cox, the regional engineer covering the Iowa area.
American Cast Iron Pipe Company	Mr. Berry Sadler	No. Probably some papers on the internet.
Plastics Pipe Institute	Camille Rubeiz	"I would recommend that you review the research report that was published by the AwwaRF and titled 'Review of Water Industry Plastic Pipe Practices'. The report was authored by Craig Thompson and David Jenkins (UC Berkeley, 1987)".
Question 2: Have you evaluated or funded research on the impact of petroleum on plastic pipe including PVC, PE, and PB? If so, what was your determination?		
Organization	**Individual Contacted**	**Response**
AWWA	Mr. Jim Wailes	AWWA has not typically conducted research. Topics for research are generally provided to AwwaRF for consideration via formal and informal communications for inclusion in AwwaRF's research selection process. The great majority of AwwaRF's subscriber-base are AWWA members as well. Via AWWA member and staff involvement with all other stakeholders in matters of water, AWWA collects and distributes knowledge via presentations, events, workshops, seminars, standards, manuals, handbooks and other presentations. Based on information available to date, AWWA would concur that contamination problems can and do occur due to permeation of plastic piping materials and gasketing products. While we are aware of on-going efforts to determine specific susceptibility of PVC versus PE and different materials for gaskets, insufficient information yet exists to derive more specific guidance in AWWA Standards or Manuals. Due to the many variables involved, our primary guidance is to acknowledge the issues of contaminant permeation, both from a water quality perspective, and from the aspect of material degradation. The later being an ongoing consideration (i.e. design life implication), regardless of whether the contaminant reaches the pipe interior or not. In the early 90's AWWA's Standards Council (SC) derived a specific permeation language statement to be included in applicable standards. The SC provides oversight for all standards writing activities conducted by the 65 Standards Committees, and 97 Standards Subcommittees under the AWWA Standards Program. The SC itself conducts written ballots for all actions regarding new and existing AWWA Standards following consensus by the applicable committee. The statement is as follows: "Permeation. The selection of materials is critical for water service and distribution piping in locations where there is likelihood the pipe will be exposed to significant concentrations of pollutants comprised of low molecular weight petroleum products or organic solvents or their vapors. Research has documented that pipe materials such as polyethylene, polybutylene, polyvinyl chloride, and asbestos cement; and elastomers, such as used in jointing gaskets and packing glands, are subject to permeation by lower molecular weight organic solvents or petroleum products. If a water pipe must pass through such a contaminated area or an area subject to contamination, consult with the manufacturer regarding permeation of pipe walls, jointing materials, etc. before selecting materials for use in that area." You should note that in 2003, the SC changed "...may be subject to permeation..." to "...are subject to permeation..." as expressed above. This is a bit different than what has been relayed to you by others, which included the "may be". With that modification, the statement will continue to be

		incorporated in applicable AWWA Standards.
National Pipe & Plastics, Inc.	Mr. Eric Paugh	Referred us to the Uni-Bell PVC Pipe Association.
Society of Plastics Engineers	Ms. Susan Oderwald	Forwarded our request to the Chair of SPE's Plastics Pipe Division, Mr. Donald E. Duvall. Obviously, we do not give out technical opinions on behalf of the Society (we would like to, but liability issue preclude us from doing so).
Engineering Systems, Inc.	Mr. Donald Duvall	It has been understood on a theoretical basis that polyolefin pipes (polyethylene or polybutylene) might be susceptible to permeation by hydrocarbon liquids because they will absorb very small amounts of such liquids at room temperature. However, I do not know the extent to which the phenomenon has actually been evaluated in any kind of laboratory study.
NSF	Ata Ciechanowski	"…you might want to contact either Unibell (for PVC) or PPI (Plastics Pipe Institute for PE)".
Awwa Research Foundation	Ms. Maureen Hodgins	I do not work for American Water Works Association. I suggest that you contact Jim Wailes, Standards Program Manager, AWWA (jwailes@awwa.org, 303-347-6177). I work for a different organization which has a similar name, AwwaRF (American Water Works Association Research Foundation), which funds research to benefit our subscribers, the drinking water community. We do have an ongoing research project which may be of interest to you, Project 2946: Impact of Petroleum-based Hydrocarbons on PE/PVC Pipes and Pipe Gaskets. I have attached a project update of prelimnary results which was published in Drinking Water Research (an AwwaRF publication). The final report will be published by mid 2007. The PIs are Say Kee Ong and James Gaunt from Iowa State University and they have presented results at a 2005 Iowa AWWA conference (also attached). Please note that these are preliminary results from an ongoing project and should not be considered as final results.
Uni-Bell PVC Pipe Association	Mr. Craig Fisher	Iowa State University is close to completing a research project on this topic. The study was funded by the American Water Works Association's Research Foundation (AwwaRF). Uni-Bell and its members donated things like pipe specimens, gasketes, end-caps, and things like that to the research effort. A short 1.5 page progress report on the research is attached.
Ductile Iron Pipe Research Association	Mr. Mark Brazlon (sp?)	Referred us to Alan Cox, the regional engineer covering the Iowa area.
American Cast Iron Pipe Company	Mr. Berry Sadler	No.
Plastics Pipe Institute	Camille Rubeiz	Question not specifically addressed.
Question 3: If you were aware of a utility project passing through a petroleum contaminated area, would you recommend the use of PVC, PE, or PB pipe? Or would your recommendation depend on the contaminant levels observed in the area (some studies suggest that PVC pipe is permeable by petroleum only at saturated conditions (which we assume to mean free product, or grossly contaminated conditions)?"		
Organization	**Individual Contacted**	**Response**
AWWA	Mr. Jim	As with all other considerations for pipe material and appurtenances (ex. size, pressure, ground

	Wailes	conditions, corrosion protection, potential for disturbance, etc.), AWWA recommends that appropriate background, experience and consideration of all aspects be applied to determining the best solution for a given situation or project.
National Pipe & Plastics, Inc.	Mr. Eric Paugh	Referred us to the Uni-Bell PVC Pipe Association.
Society of Plastics Engineers	Ms. Susan Oderwald	Forwarded our request to the Chair of SPE's Plastics Pipe Division, Mr. Donald E. Duvall. Obviously, we do not give out technical opinions on behalf of the Society (we would like to, but liability issue preclude us from doing so).
Engineering Systems, Inc.	Mr. Donald Duvall	Question not specifically addressed.
NSF	Ata Ciechanowski	"…you might want to contact either Unibell (for PVC) or PPI (Plastics Pipe Institute for PE)".
Awwa Research Foundation	Ms. Maureen Hodgins	Refer to AWWA recommendations. Perhaps in AWWA's PVC Pipe Design and Installation (M23) or Piping Handbook?
Uni-Bell PVC Pipe Association	Mr. Craig Fisher	The bad actors for PVC pipe are low molecular weight organic chemicals rather than petroleum. So it is additives in the gasoline (or other petroleum product) rather than the petroleum product itself. At extremely high levels, additives like benzene, toulene, or xylene can be a problem. Those levels are not found in gasoline but could be found in a site that is grossly contaminated. For gaskets, we typically refer folks to S&B Technical Products. They are the largest gasket supplier for all types of piping products - PVC, ductile iron, concrete, steel.
Ductile Iron Pipe Research Association	Mr. Mark Brazlon (sp?)	Referred us to Alan Cox, the regional engineer covering the Iowa area.
American Cast Iron Pipe Company	Mr. Berry Sadler	No, would not recommend the use of plastic pipe.
Plastics Pipe Institute	Camille Rubeiz	Questions not specifically addressed.
Question 4: Have you observed or been made aware of any known problems with petroleum permeation of plastic water lines? If so, can you recall what type of plastic pipe was permeated (i.e., PVC, PE, PB, HDPE, etc.)? We are particularly interested in permeation of PVC pipe. If you are aware of any occurrences, can you recall if it occurred in a grossly contaminated area?		
Organization	**Individual Contacted**	**Response**
AWWA	Mr. Jim Wailes	See attached listing. Insufficient data yet exists for more detailed consensus on contaminant levels, other than to acknowledge the provision of due diligence to formulate appropriate practices for a particular project condition.
National Pipe & Plastics, Inc.	Mr. Eric Paugh	Referred us to the Uni-Bell PVC Pipe Association.

Society of Plastics Engineers	Ms. Susan Oderwald	Forwarded our request to the Chair of SPE's Plastics Pipe Division, Mr. Donald E. Duvall. Obviously, we do not give out technical opinions on behalf of the Society (we would like to, but liability issue preclude us from doing so).
Engineering Systems, Inc.	Mr. Donald Duvall	It has been understood on a theoretical basis that polyolefin pipes (polyethylene or polybutylene) might be susceptible to permeation by hydrocarbon liquids because they will absorb very small amounts of such liquids at room temperature. However, I do not know the extent to which the phenomenon has actually been evaluated in any kind of laboratory study.
NSF	Ata Ciechanowski	"…you might want to contact either Unibell (for PVC) or PPI (Plastics Pipe Institute for PE)".
Awwa Research Foundation	Maureen Hodgins	Refer to AWWA.
Uni-Bell PVC Pipe Association	Mr. Craig Fisher	Iowa State University gave a poster session at the San Francisco 2005 AWWA Annual Conf. and Exposition that discusses the results of their survey of utlities on their permeation experiences. I have attached a Word document copy of that paper.
Ductile Iron Pipe Research Association	Mr. Mark Brazlon (sp?)	Referred us to Alan Cox, the regional engineer covering the Iowa area. Prior to disconnection, Mr. Brazlon indicated PVC pipe is permeable. There are documented cases of it.
American Cast Iron Pipe Company	Mr. Berry Sadler	No direct experience with this.
Plastics Pipe Institute	Camille Rubeiz	Question not specifically addressed.
Question 5: Have you observed or been made aware of any known problems with petroleum permeation through pipe gaskets? Are you aware of any recommendations for the use of special pipe gasket materials in petroleum contaminated areas?		
Organization	**Individual Contacted**	**Response**
AWWA	Mr. Jim Wailes	See attached listing. Gaskets are known to be problematic, and involve all piping materials where gaskets are used (ex. DI, PVC, concrete, AC, steel.) Our understanding is that nitrile and viton is generally being used to address this issue. City of Calgary, Alberta, is known to be very proactive in establishing gasketing and pipe material procedures in regard to the permeation. See contact below.
National Pipe & Plastics, Inc.	Mr. Eric Paugh	Referred us to the Uni-Bell PVC Pipe Association.
Society of Plastics Engineers	Ms. Susan Oderwald	Forwarded our request to the Chair of SPE's Plastics Pipe Division, Mr. Donald E. Duvall. Obviously, we do not give out technical opinions on behalf of the Society (we would like to, but liability issue preclude us from doing so).
Engineering Systems, Inc.	Mr. Donald Duvall	Question not specifically addressed.
NSF	Ata	"…you might want to contact either Unibell (for PVC) or PPI (Plastics Pipe Institute for PE)".

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Awwa Research Foundation	Maureen Hodgins	Refer to AWWA.
Uni-Bell PVC Pipe Association	Mr. Craig Fisher	One of the papers we can send you is an AWWA Journal article on gaskets. Also, see the attached items. It may be necessary to switch from a standard SBR gasket to a nitrile gasket in some cases.
Ductile Iron Pipe Research Association	Mr. Mark Brazlon (sp?)	Referred us to Alan Cox, the regional engineer covering the Iowa area. Prior to disconnection, Mr. Brazlon indicated Nitrile gaskets should be used in the first tier of contamination (lower contaminants) and Fluorocarbon gaskets should be used in higher levels of contaminants. Fluorocarbon gaskets are commonly referred to as Viton gaskets. Viton gaskets are extremely expensive.
American Cast Iron Pipe Company	Mr. Berry Sadler	No, he has not personally observed petroleum permeation problems through pipe gaskets. Recommends the use of fluoroelastic gaskets such as Viton gaskets in contaminated areas.
Plastics Pipe Institute	Camille Rubeiz	Question not specifically addressed.
Question 6: Are you aware of other contacts from who we could acquire information on this subject?		
Organization	**Individual Contacted**	**Response**
AWWA	Mr. Jim Wailes	Ductile Iron Research Association, Uni-Bell PVC Pipe Association, Plastic Pipe Institute. Also, suggest you contact: Mr. Roy Brander, Calgary Waterworks, City of Calgary, (403) 268-2176.
National Pipe & Plastics, Inc.	Mr. Eric Paugh	Referred us to the Uni-Bell PVC Pipe Association.
Society of Plastics Engineers	Ms. Susan Oderwald	Forwarded our request to the Chair of SPE's Plastics Pipe Division, Mr. Donald E. Duvall.
Engineering Systems, Inc.	Mr. Donald Duvall	There are two places where you might go for more information. The Plastics Pipe Institute (PPI) in Washington, DC is the leading polyolefin pipe trade organization in North America. The Uni-Bell PVC Pipe Association of Dallas, TX is a similar trade group that represents the interests of the PVC water pipe industry. Two other organizations that might have information on this issue are the American Water Works Association (AWWA) and the National Sanitation Foundation (NSF).
NSF	Ata Ciechanowski	"…you might want to contact either Unibell (for PVC) or PPI (Plastics Pipe Institute for PE)".
Awwa Research Foundation	Maureen Hodgins	Jim Wailes, AWWA, contact info above. Say Kee Ong and James Gaunt (jagaunt@iastate.edu, 515-294-8216), Iowa State University Maybe the American Gas Association Manufacturers or Trade Associations for PVC, PE, PB, HDPE, such as UniBell, Plastic Pipe Institute etc.
Uni-Bell PVC	Mr. Craig	Jim Gaunt and Say Kee Ong at Iowa State University.

Pipe Association	Fisher	Claudio Dittel at S&B Technical Products
Ductile Iron Pipe Research Association	Mr. Mark Brazlon (sp?)	Referred us to Alan Cox, the regional engineer covering the Iowa area.
American Cast Iron Pipe Company	Mr. Berry Sadler	No.
Plastics Pipe Institute	Camille Rubeiz	"I would recommend that you review the research report that was published by the AwwaRF and titled 'Review of Water Industry Plastic Pipe Practices'. The report was authored by Craig Thompson and David Jenkins (UC Berkeley, 1987)".